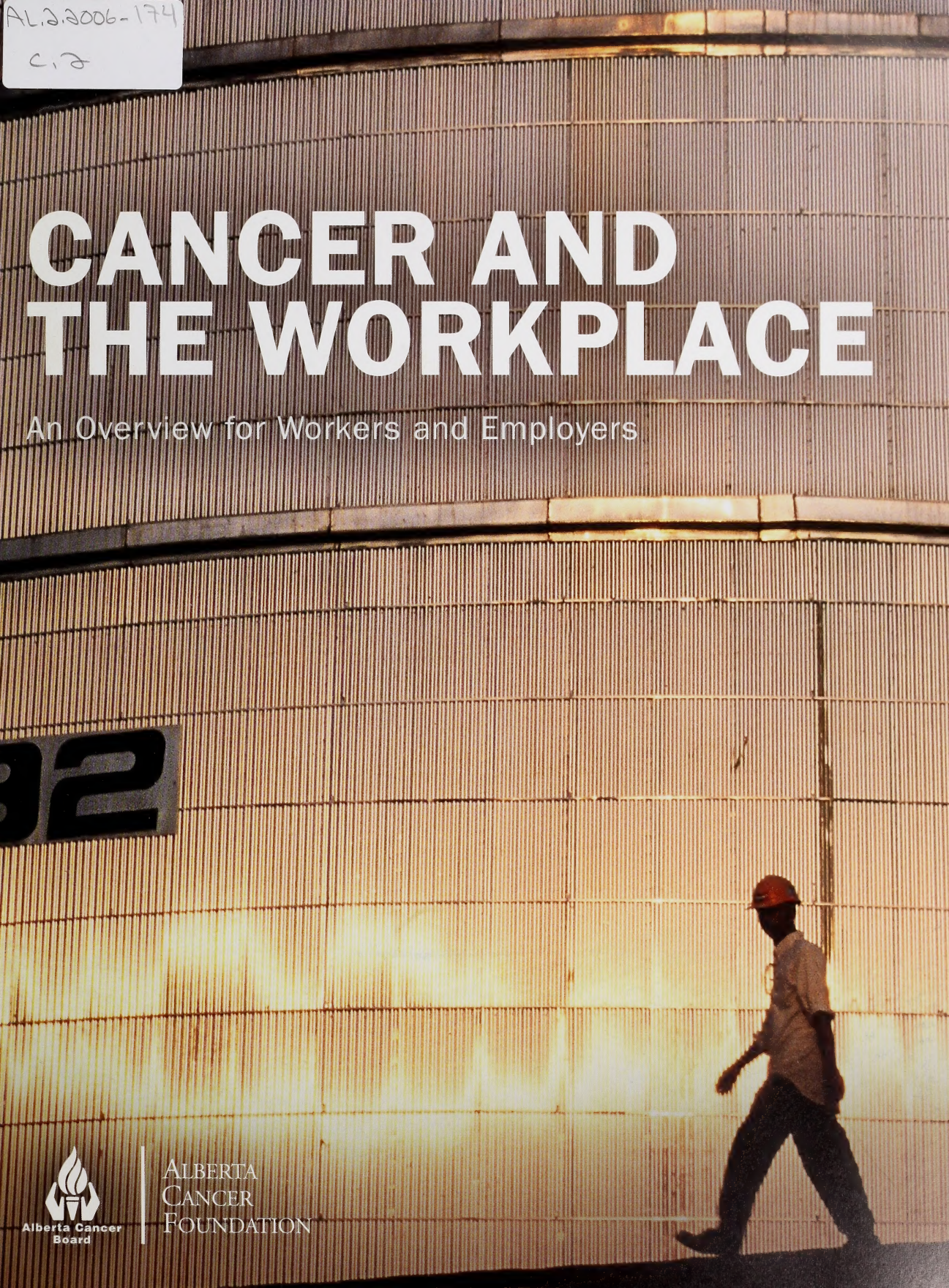
CANCER AND THE WORKPLACE

An Overview for Workers and Employers



Alberta Cancer Board

Alberta Cancer Foundation

TABLE OF CONTENTS

All cases of occupational cancer can be prevented

INTRODUCTION

Preventing cancer in the workplace

The *Cancer and the Workplace* booklet introduces basic concepts related to **occupational cancer** and general cancer prevention. It was created in response to the need for updated, user-friendly information on occupational cancer and cancer at the workplace. This booklet has been designed as a tool for employers and workers to gain a better awareness and understanding of cancer and its potential causes.

Occupational cancer can be prevented by removing or reducing exposures to probable and known **carcinogens**. For example, every measure should be taken to prevent chemicals from becoming airborne and inhaled, or making contact with the skin. This booklet presents safety messages for workers and employers with the aim to reduce exposure to carcinogens.

The *Cancer and the Workplace* booklet acknowledges that work is one of the determinants of health. The work environment is part of a complex set of factors or conditions that can influence the level of health of each and every person. Unsafe work (without the proper controls in place) is associated with poorer health. People who have more control over their work circumstances, and experience fewer stresses related to their jobs, are healthier and often live longer than those in more stressful or high risk work environments.

This booklet is designed to provide a general overview of cancer and the workplace and as such, does not go into detail about specific workplace exposures or industries. To get more information about a specific workplace exposure, please refer to the contact information on page 18. Definitions for the terms that appear in **bold blue** type throughout this publication can be found in the glossary on page 20.

WHAT IS CANCER?

Cancer is the result of changes in the genes that control the growth and death of normal cells. These changes may be inherited or they may result from lifestyle factors such as tobacco use. Changes can also be triggered by cancer-causing (carcinogenic) agents present in the physical environment or the diet.

Under normal circumstances, cells in the body grow and multiply at a specified rate. When cancer occurs in the body, the **DNA** is damaged. If a cell's DNA is damaged, the cell may divide continuously. This uncontrolled growth results in a **tumour**, which is an abnormal mass of tissue. The tumour may invade and destroy neighbouring tissues. Some of these cells may travel to other parts of the body, causing more tissue damage. Cancer becomes fatal when tissue destruction makes it impossible for major organs to function.

The language of cancer

Types of tumours

A tumour can be benign or malignant. **Benign** tumours are generally slow growing and do not spread. They may be harmless, unless they affect the function of surrounding tissues.

Malignant tumours spread rapidly, invading neighbouring tissues. They can **metastasize** to other parts of the body. Tumours are also classified by the type of tissue they affect. For example, **carcinoma**, the most common type of tumour, refers to tumours that occur in the cells that line the organs and cover the surface of the body. **Leukemia** and **lymphoma** refer to tumours occurring in the blood (leukemia) and immune (lymphoma) systems. **Sarcoma** refers to tumours that occur in fibrous tissue, muscle, or bone.

Cancer can begin at almost any site in the body and reacts differently depending on its point of origin. Cancers are most often named for the part of the body in which they originate.

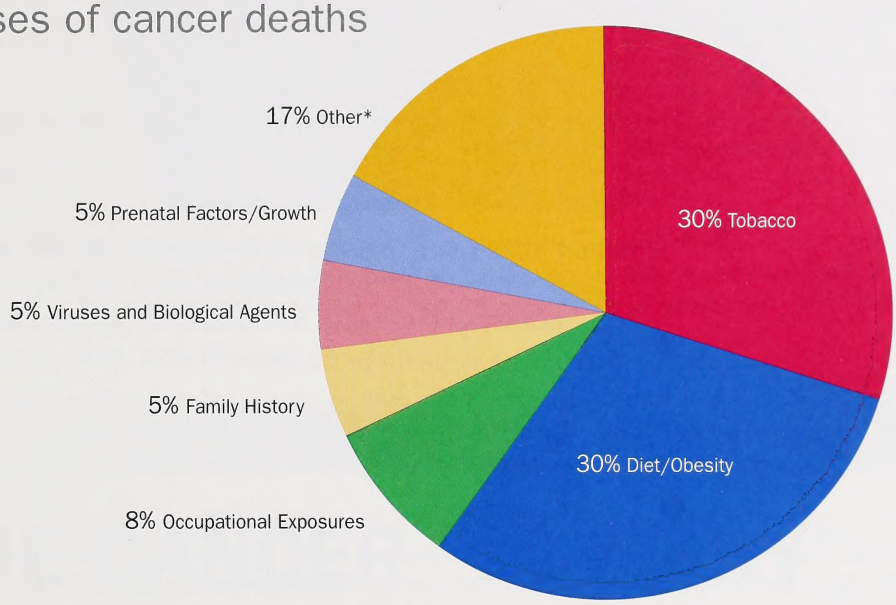
Diagnosis and treatment

Cancer is diagnosed using **imaging studies**, such as X-rays, ultrasound, CT (computerized tomography) scans, MRI (magnetic resonance imaging) and bone scans. Blood tests and **biopsies** are also used to diagnose cancer.

The **stage** of the cancer depends on the size of the tumour and the extent to which the disease has spread. Surgery is commonly used to remove cancerous growths. Cancer can also be treated by **radiation therapy**, where radiation beams are directly aimed at a tumour or group of tumours. **Chemotherapy** is a method of treating cancer with the use of drugs or medications. A combination of treatments is often used to treat cancer patients. The choice of treatments depends on the type, location and size of the tumour.

Cancer may result from lifestyle factors such as tobacco use or may be due to cancer-causing agents in the diet and in the environment

Causes of cancer deaths



*Other factors include Reproductive Factors, Alcohol, Socioeconomic Factors, Environmental Pollution, and Radiation/Sunlight
Source: Adapted from Colditz et al., 1996 and Nurminen & Karjalainen, 2001

What causes cancer?

Most cancer deaths are related to tobacco use, inactive lifestyle, obesity and diet. Based on current scientific data on occupational exposures and cancer, it is estimated that occupational exposures account for approximately 8% of cancer cases in the population. However, among those exposed to **occupational carcinogens**, the proportion of cancer attributable to these exposures is likely greater. It is important to note that this model is an estimate, and is based on studies of general patterns of cancer in the population. For an individual, a number of different factors are thought to interact to contribute to cancer, rather than a single factor. These interactions are still not fully understood.

Anything that increases a person's chance of developing a disease is called a **risk factor**. Each type of cancer has different risk factors, but in general, risk factors for cancer include:

- Tobacco use.
- A diet low in vegetables and fruits.
- Inactive lifestyle.
- A **body mass index** (BMI) of 25 or higher.
- Over-exposure to ultraviolet radiation including the sun/UV rays.
- Exposure to cancer-causing agents in the workplace and general environment.
- Personal characteristics such as age, gender, and race.
- A family history of cancer.
- The presence of certain medical conditions, such as chronic infection with Hepatitis B or Hepatitis C.

Myths and truths about cancer

Cancer is a single disease

FALSE. Cancer is not one disease, but many. Each type of tissue within each organ in the body can develop several distinct types of cancer.

Only elderly people can get cancer

FALSE. The occurrence of cancer increases in older age groups, but children, teenagers and middle-aged adults can also get cancer. Among those aged 35-64 in Alberta, cancer kills more people than heart disease, unintentional injury and infectious diseases combined.

Cancer is the leading cause of early death in Canada

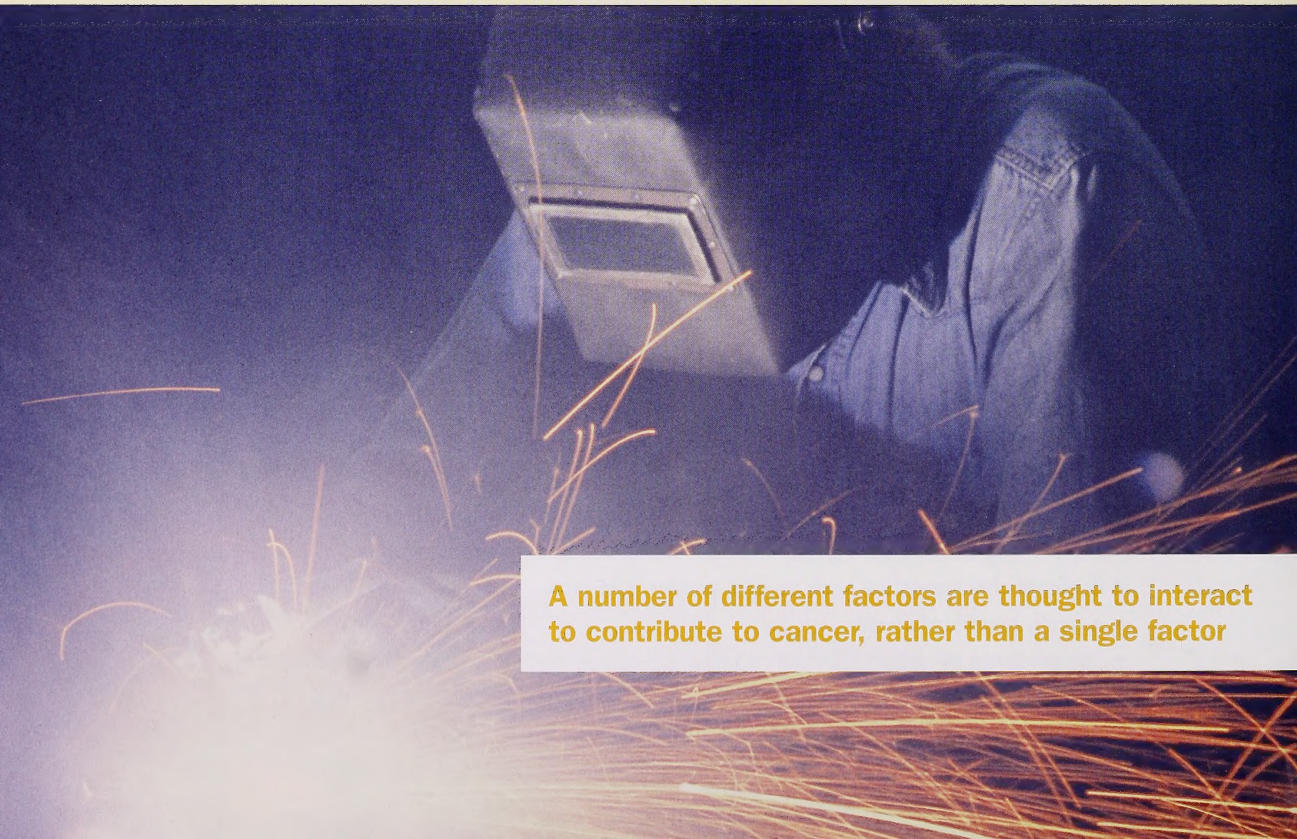
TRUE. Cancer is the leading cause of premature death in Canada and is one of the leading causes of death in the country, responsible for approximately 30% of deaths each year. Forty percent of Canadians will develop some form of cancer in their lifetime.

The cause of a cancer can be determined in an individual

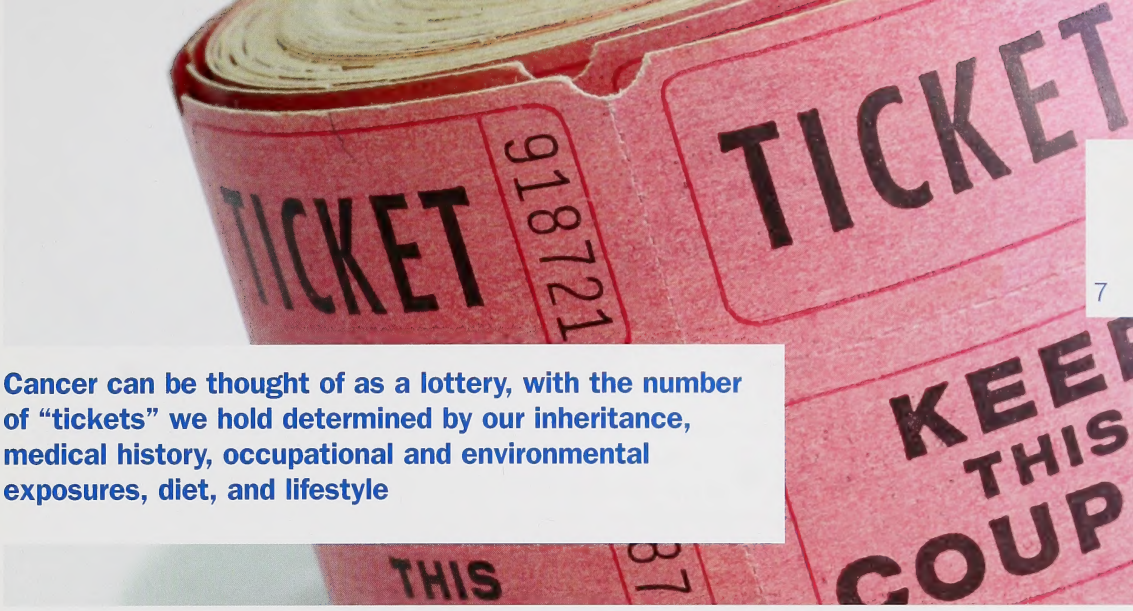
FALSE. There is no "test" to determine what caused a cancer in an individual. Some cancers are strongly linked to a particular risk factor (for example, **mesothelioma** and asbestos exposure) but most cancers cannot be attributed to a single risk factor or cause.

Some people are more at risk for developing cancer than others

TRUE. Individual genetics contribute to the risk of occupational and non-occupational cancers. However, individual genetics may pose no risk in the absence of exposure to environmental and lifestyle risk factors.



A number of different factors are thought to interact to contribute to cancer, rather than a single factor



Cancer can be thought of as a lottery, with the number of "tickets" we hold determined by our inheritance, medical history, occupational and environmental exposures, diet, and lifestyle

THE CANCER "LOTTERY"

The following analogy was developed by an occupational physician in Alberta, Dr. Ken Corbet, to explain to his patients how lifestyle and environment can increase or reduce a person's risk of cancer.

In the dictionary, a lottery is defined as "an event or affair whose outcome is or seems to be determined by chance." Cancer, too, can be thought of as a lottery, with the number of tickets we hold determined by our inheritance, medical history, occupational and environmental exposures, diet, and lifestyle.

At birth, each of us receive lottery tickets due to our genetics – relating in large part to our family history of cancer. The process of aging automatically gives us extra tickets. Throughout our life, we collect extra tickets on a daily basis because of exposure to risk factors for cancer.

Environmental factors include background radiation, occupational and non-occupational exposure to carcinogens in air, water, food, soil, and consumer products. For example, each time we get a sunburn we add to our chances for developing skin cancer.

Lifestyle factors that can increase our number of tickets include smoking, obesity, and level of exercise. Our diet contains a combination of foods that may be protective for cancer, such as vegetables and fruits, or pose a risk for cancer (present naturally within the food, or introduced though additives or cooking).

Medical conditions such as chronic Hepatitis B or C infection can increase our number of tickets, as can exposure to medical X-rays, radiation treatment, and chemotherapy.

Like a real lottery, the more tickets we have, the greater the chance that we will develop cancer – but just because we have tickets, and collect a few more each day, does not mean that it will be one of us who develops cancer. Conversely, we may have very few tickets in the cancer lottery, but one of them is the ticket that will cause a cancer.

This is one way to explain why young adults with minimal risks for cancer can still develop cancer, and why some older people with exposure to multiple risk factors for cancer do not develop the disease.

CANCER CLUSTERS IN THE WORKPLACE

If you throw confetti uniformly across a table, you might notice that some pieces of confetti appear to "cluster" around some parts of the table. It could be that this clustering is due to chance. Or, it could be that you see a cluster because of the particular angle at which you are standing while viewing the table. Another possible explanation is that there is a sticky substance on part of the table that is causing the confetti to stick. Cancers in the workplace can appear to cluster for a number of reasons – it could be due to chance, or there could be an underlying cause that warrants further investigation.

When there is a greater than expected number of cancers at a particular workplace, workers may begin to suspect that there is a **cancer cluster** present. A true cancer cluster is related to a common exposure shared by the affected workers. However, when there are cancers of different sites and tissues present among workers at a particular workplace, they are not likely to be linked by a common exposure or risk factor. It is also important to note that approximately 1 in 3 Albertans will develop cancer in their lifetime, so what may appear to be an abnormally high number of cancers may very well reflect the rates in Alberta as a whole.

If workers, employers or physicians suspect that there are an unusually high number of cancers present in a particular workplace, the Medical Officer of Health for the health region and Workplace Health and Safety should be contacted (see page 18 for contact information). The Medical Officer of Health will determine if a statistical analysis is needed, and can request this analysis from the Alberta Cancer Board.

A statistical analysis may reveal that the number of cancer cases at the workplace reflects the rates of cancer in the Alberta population. If, however, the Medical Officer of Health and Workplace Health and Safety suspect that the cluster is not due to chance alone, the possibility that a link exists between a workplace exposure and cancer may be investigated. Many types of research studies can be conducted to assess whether or not this is the case. For instance, investigators will try to identify some possible workplace exposures that occurred in the past, as most adult cancers do not appear until years or decades after exposure to the cancer-causing agent (this interval is called the **latency period**).

If workers, employers or physicians suspect that there are an unusually high number of cancers present, they can arrange to speak to a Medical Officer of Health and Workplace Health and Safety

WORKPLACE EXPOSURES

Occupational carcinogens and cancer

Carcinogens can be chemical (e.g., benzene), physical (e.g., ionizing radiation) or biological (e.g., Hepatitis C) in nature.

Carcinogens can enter the body through one or more routes, including:

- **Inhalation – breathing gases, dust or vapours**
- **Absorption through the skin**
- **Ingestion with food**
- **Direct exposure to radiation**

Occupational carcinogens are those carcinogens that workers may be exposed to as a result of work activities. Workers in certain industries are more at risk than the general population.

Occupational cancer is a cancer that arises out of an individual's work activity. Occupational cancers are usually indistinguishable from cancers which are unrelated to occupation. For example, lung cancer caused by exposure to asbestos is indistinguishable from lung cancer due to tobacco use.

Although scientists have identified a number of confirmed human carcinogens, they are often unsure of how multiple agents can work together to increase one's risk of developing cancer. Studying occupational cancer is very challenging because of the long latency of cancer and the involvement of many factors in the development of cancer. Interactions between two or more carcinogens in the workplace are poorly understood. Exposure to more than one potentially cancer-causing agent could result in no interaction, an **additive effect**, or more than an additive effect.

The presence of a chemical in the work environment does not automatically mean that workers are exposed to it. There is no risk of cancer unless an agent is incorporated into the body through inhalation, ingestion, absorption through the skin, or direct exposure.

Occupational cancer in Canada

All provinces in Canada maintain cancer registries that record new cases of cancer among residents of that province. The Alberta Cancer Board fulfills the function of providing a cancer registry in the province. Workplace information is not routinely collected by the registry. Determining whether the workplace is the cause of cancer is a difficult task that requires extensive data collection.

Reducing exposure to carcinogens

Eliminating hazardous materials or substituting them with less hazardous materials, is the most effective way of reducing exposure to materials that are toxic or pose other hazards. Other methods of controlling worker exposure to chemicals include: **engineering controls** (isolation; enclosure; local exhaust ventilation and process or equipment modification); **administrative controls** (good housekeeping; work practices, and hygiene practices); and **personal protective equipment**. All of these methods reduce or eliminate the risk of injury or harm by interrupting the path of exposure between the hazardous materials and the worker.

Employee education is an essential component of programs aimed at controlling worker exposure. Workers must be knowledgeable of control measures and the adverse effects associated with exposures at their workplace.

How exposure to carcinogens is measured

A **workplace exposure assessment** is the measurement of hazardous materials in the workplace environment by **area sampling** or **personal sampling**. Both methods have their uses, depending on the work conditions and worker mobility. The employer must assess worker exposure if the worker may be exposed to a harmful substance. Monitoring must be done by a competent person who is familiar with sampling methods.

For some cancer-causing agents, **biological sampling** can show how much of a chemical has been taken into the body as a reflection of exposure to the chemical from all sources through all routes. It involves testing a sample of a person's breath, urine or blood. In some cases, area sampling, personal sampling and biological sampling can be effectively combined to measure exposure to occupational carcinogens. Biological sampling is not a substitute for workplace exposure assessment.

SAFETY MESSAGES FOR WORKERS

There are many ways to protect yourself

Be vigilant at the workplace

- Minimize exposures at the workplace.
- Know the name, chemical composition and health effects of all substances you work with.
- Get a copy of the **Material Safety Data Sheet (MSDS)**.
- Wear personal protective equipment and follow instructions on correct usage.
- Report every spill, leak and accident immediately.
- Talk to your employer about any hazards (for example, radiation or chemicals) that you need to be aware of.
- Participate in training and monitoring programs provided by your employer.
- Insist that your work environment be designed to prevent exposure to toxic substances.
- Keep a list of all the jobs and industries that you have worked in. It will help if you need to file an occupational disease claim.
- Respect smoke-free regulations.

Develop safe personal habits at work

- Keep hands away from your lips and mouth.
- Don't eat, chew or drink in the work area.
- Don't rub your sleeves on your face.
- Always wash your hands and face thoroughly with soap and water before eating and after using the washroom.
- Rinse your mouth before eating or drinking.
- Avoid breathing chemical vapours.
- Avoid skin contact with chemicals.

Do not bring hazards home

- Wash as soon as possible after finishing work and preferably before coming home.
- Immediately change clothes soiled or soaked with chemicals to prevent contact with skin.
- Remove work clothes before eating and before leaving work.
- Use a change area separate from the work area.
- Separate work clothes from all other clothes.
- Keep work clothes clean. If you take work clothes home to be cleaned, put them in a plastic bag, and put the bag of work clothes in the trunk of your vehicle.
- Keep work clothes away from other laundry and wash them separately.
- Do not take tools, scrap, chemicals, packaging, and similar items home.

Go tobacco-free

- Advocate for smoke-free regulations at the workplace. In addition to its direct health effects, tobacco smoke can also dramatically increase or add to the severity of health effects of other inhaled chemicals.
- If you are a smoker, make use of available cessation programs. Cigarette smoke and secondhand smoke contain many known carcinogens.
- Chewing tobacco and snuff are not safe alternatives to smoking as they also present risks.

Take control of your health

- Eat at least five to ten servings of vegetables and fruits daily.
- Maintain a healthy body weight through regular physical activity and healthy eating. It is recommended that everyone participate in at least 45 minutes of continuous moderate to vigorous physical activity on five or more days of the week.
- Protect your skin from over-exposure to sunlight by wearing hats, long-sleeved shirts and pants, sunscreen of SPF15 or higher, and seeking shade when possible.
- See your doctor to ensure that you are screened for conditions appropriate to your age group, medical and family history. If you think you might have health problems from your work, tell your doctor about your job, hazards you are exposed to, your symptoms, and past jobs.

SAFETY MESSAGES FOR EMPLOYERS

There are many ways to protect your workers

Education

- Educate workers about the hazards associated with chemicals in the workplace.
- Advise workers about mandatory participation in training and monitoring programs.

Hygiene

- Encourage good personal hygiene practices; workers must not eat, drink or use tobacco products in areas contaminated by chemicals. The hands and face should be washed before eating or drinking.

Protection

- Review your inventory of chemicals and ensure that the products being used in the workplace are the least hazardous possible for the intended use.
- Ensure engineering controls and other equipment used to reduce exposure are in place and used properly.
- Ensure appropriate personal protective equipment (PPE) and clothing are used.
- Ensure unprotected workers are not in an area where products containing harmful substances are used.
- Keep exposure records for all your workers.

Storage

- Ensure harmful substances are properly stored.
- Ensure product containers are kept tightly sealed when not in use.

Sun safety

- Develop a sun protection policy for your workplace. The Alberta Cancer Board provides information on developing a sun protection policy. See page 18 for contact information.
- Provide shade at the site, even with temporary shade structures, that outdoor workers can use while working or during breaks.
- Between May and August, when the sun's rays are stronger, schedule work before 11:00 a.m. or after 4:00 p.m. when possible.

Tobacco

- Ban smoking at the workplace. Tobacco use is shown to increase costs to the employer by affecting productivity, increasing the number of sick days, and increasing the cost of health benefits.
- Support smoke-free workplaces by endorsing cessation programs for your workers. Research studies have shown that workplace smoking bans help smokers cut back and quit.

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS)

WHMIS is a Canada-wide legislated system that applies to most hazardous materials used in the workplace. It has three components:

- Labels on hazardous materials and their containers. Labels immediately alert employers and workers to the hazards of products and provide basic safety precautions.
- Material Safety Data Sheets (MSDS) provide detailed information about the properties of a product, hazards associated with the product, first aid measures, and how to handle, use, store and dispose of the product safely. If the product or its ingredients are carcinogenic, this information will appear in the "Toxicity" section of the MSDS.
- Worker education and training helps workers understand the risks associated with hazardous materials and procedures required to work safely with or around these products.

FREQUENTLY ASKED QUESTIONS*

What is the relationship between asbestos exposure and smoking?

Combined exposure to tobacco smoke and asbestos is more harmful than exposure to either substance on its own. This means that workers exposed to both carcinogenic agents face a much greater chance of developing lung cancer than workers exposed to tobacco smoke or asbestos alone. Anyone with a history of exposure to asbestos is strongly encouraged to quit smoking.

Does wearing personal protective equipment (PPE) stop exposure and help prevent cancer?

Personal protective equipment, when fitted and worn correctly, minimizes toxic exposures. As PPE does not minimize or eliminate the hazard itself, PPE should always be used along with a more effective control method when possible. In other words, it should be the last line of defence.

Since many cancer-causing illnesses occur after years of exposure, what are the chances of developing cancer without the PPE?

It is impossible to estimate an individual's chances of developing cancer, as a number of factors are involved. However, it is important that every possible step be taken to minimize toxic exposures. This includes correctly using and wearing PPE, especially if the hazard assessment determines PPE needs to be worn.

What happens if the government suspects that a new chemical used in the workplace may be a carcinogen?

If animal or human studies are published that show an association between a workplace chemical and cancer, government regulators try to assess the human health risk and decide if greater workplace controls are needed. All occupational chemicals should be used as safely as possible. (See "Reducing exposure to carcinogens" on page 11.)

When a group of people in the same workplace develop cancer, is there a chance that a workplace exposure could have caused this cancer?

Yes, it is possible. However, there are many things that should be considered before a judgment can be made as to whether or not a workplace exposure is associated with cancer. (See "Cancer Clusters" section on page 8 for more detailed information.)

* Frequently asked questions were developed in consultation with Occupational Health Nurses in Alberta based on questions from workers.

Workers and Employers who are concerned about a workplace exposure can:

- **Talk to the health and safety committee at their workplace**
- **Talk to the occupational health nurse or occupational health professional at their work site**
- **Speak to their doctor**
- **Call the Workplace Health and Safety Contact Centre**
  (see page 18 for contact information)

NEED MORE INFORMATION?

Organizations and online resources

Cancer

Alberta Cancer Board – www.cancerboard.ab.ca

The Alberta Cancer Board (ACB) is the provincial health authority responsible for cancer facilities and programs in Alberta including cancer prevention, early detection, diagnosis, treatment, research, and education. The *Sunright Sun Safety Policy Guide for Outdoor Workers* can be downloaded at this website.

Canadian Cancer Society – www.cancer.ca

A national, community-based organization of volunteers, the mission of the Canadian Cancer Society is the eradication of cancer and the enhancement of the quality of life of people living with cancer through fundraising for research, advocacy, prevention, information and patient support.

IARC – International Agency for Research on Cancer (France) – www.iarc.fr

This agency coordinates and conducts both epidemiological and laboratory research into the causes of cancer.

General health

Canadian Health Network – www.canadian-health-network.ca/

This web-based health information service is sponsored by Health Canada and a number of other Canadian health organizations.

Health Link Alberta

This service provides advice and information 24 hours a day, seven days a week from a registered nurse.

Phone: 408-LINK (5465) in Edmonton, 943-LINK (5465) in Calgary or, outside the local calling area, call toll-free 1-866-408-LINK; website: www.healthlinkalberta.ca for health information online.

Occupational health

Alberta Federation of Labour – www.afl.org

The AFL is a voluntary association of unions and employee organizations. Their site contains policy papers and publications such as *The Continuing Struggle for A Safe and Healthy Workplace: A Revised Handbook for Health & Safety Activists.*

Alberta Workers' Health Centre – www.workershealthcentre.ca

A registered charity, this organization specializes in assisting workers to identify workplace hazards, and to make the link between exposure and disease.

Canada's National Occupational Health and Safety Website – www.canoshweb.org

This site organizes information provided by the federal, provincial, and territorial governments of Canada and by the Canadian Centre for Occupational Health and Safety.

Canadian Centre for Occupational Health and Safety – www.ccohs.ca

This national organization provides information and advice about occupational health and safety.

Government of Alberta, Workplace Health & Safety – www.worksafely.org

This division of Alberta Human Resources and Employment helps ensure workplaces are fair, safe, and healthy.

Workplace Health and Safety Contact Centre (Edmonton and surrounding area: 415-8690; elsewhere in Alberta: 1-866-415-8690).

National Institute for Occupational Safety and Health (U.S.A.) – www.cdc.gov/niosh
Centers for Disease Prevention and Control

The American federal agency responsible for investigation and evaluation of workplace hazards.

National Occupational Health & Safety Commission (Australia) – www.nohsc.gov.au

Australia's national agency for investigation and evaluation of workplace hazards.

Occupational Safety & Health Administration (U.S.A.) – www.osha.gov

U.S. Department of Labor

Sets and enforces standards; provides training, outreach, and education; establishes partnerships; and encourages continual improvement in workplace safety and health.

Workers' Compensation Board – Alberta – www.wcb.ab.ca

The WCB is a not-for-profit mutual insurance corporation funded by employers which provides workplace liability and disability insurance to workers and employers in Alberta.

Tobacco

Action on Smoking and Health (ASH) – www.ash.ca

Western Canada's leading tobacco control organization. ASH supports the development of public policies to reduce tobacco use and exposure to secondhand smoke in Alberta and beyond. Individuals and organizations who are interested in getting involved with local and provincial campaigns to protect Albertans from secondhand smoke in workplaces and public establishments can contact ASH at (780) 426-7867.

Alberta Alcohol and Drug Abuse Commission (AADAC) – www.aadac.com

AADAC operates a telephone service which provides counseling support and community resources to the public from 8 a.m. to 8 p.m. daily.

Phone: 1-866-33-AADAC (1-866-332-2322)

In conjuction with The Lung Association, Alberta/NWT and Canadian Cancer Society, Alberta/NWT, AADAC also offers a free online smoking cessation program: www.albertaquits.ca

Toxic substances

Agency for Toxic Substances and Disease Registry (U.S.A.) – www.atsdr.cdc.gov
Centers for Disease Control

The CDC aims to use the best science, to take responsive public health actions, and provide trusted health information to prevent harmful exposure and disease related to toxic substances.

Motherisk – www.motherisk.org

A Toronto-based program at the Hospital for Sick Children that provides information and guidance to pregnant or lactating patients and their health care providers about the fetal risks associated with drug, chemical, infection, disease and radiation exposure(s) during pregnancy.

PADIS – Alberta's Poison and Drug Information Service
Foothills Medical Centre; Calgary, Alberta

This service provides advice and information to people exposed to toxins in the workplace and offers 24-hour emergency information and advice about poisonings to both the general public and health care professionals.

Phone: 944-1414 in Calgary or, outside the local calling area, call toll-free 1-800-332-1414.

Information is accurate at time of publishing.

GLOSSARY OF TERMS

Additive effect
Where the effect of two chemicals acting simultaneously is the simple sum of the effects that they would have if acting alone.

Administrative controls
Changes in work procedures such as written safety policies, rules, supervision, and training with the goal of reducing the duration, frequency, and severity of exposure to hazardous chemicals or situations. Also known as work practice controls.

Area sampling
Sampling of the air in the workplace through the use of a stationary sampling device.

Benign
Refers to a tumour that is not malignant (i.e., does not spread).

Biological sampling
Measuring hazardous substances in biologic materials (such as blood, hair, urine, or breath) to determine whether exposure has occurred.

Biopsy
The removal and examination of tissue, cells, or fluids from the living body.

Body Mass Index (BMI)
A ratio of weight to height.

Cancer cluster
A greater-than-expected number of cancer cases that occur within a group of people.

Carcinogen
A substance or energy that causes cancer.

Carcinoma
A tumour that begins in the skin or in tissues that line or cover body organs.

Chemotherapy
The use of chemical agents in the treatment or control of cancer.

DNA (deoxyribonucleic acid)
The molecules inside cells that carry genetic information and pass it from one generation to the next.

Elimination
Removing a hazardous substance from the workplace.

Engineering controls
Method of controlling exposure by eliminating or reducing the amount of a contaminant released into the work environment by controlling it at the source, or putting a barrier between the contaminant and the worker.

Epidemiology
The study of disease patterns in human populations.

Imaging studies
Technology used to visualize and diagnose a variety of cancers.

Latency period
The time between exposure to a cancer-causing agent and the subsequent appearance of cancer.

Leukemia
Cancer of the blood.

Lymphoma
Cancer of the immune system.

Malignant
Refers to a tumour that invades and destroys surrounding tissues, may spread elsewhere in the body, and is likely to recur after removal; a cancerous tumour.

Material Safety Data Sheet (MSDS)
A document that lists a substance's identity, chemical and physical properties, health hazard information, precautions for use, and safe handling information.

Mesothelioma
A tumour derived from the tissue that lines the chest or abdominal cavities.

Metastasize
To spread from the original tumour to other parts of the body.

Occupational cancer
Cancer that arises out of an individual's work activity. Sometimes referred to as work-related cancer or workplace cancer.

Occupational carcinogen
A substance or energy that causes cancer that workers may be exposed to as a result of work activities.

Personal protective equipment (PPE)
Includes all clothing and other work accessories designed to create a barrier against workplace hazards. Examples include safety goggles, face shields, hard hats, hearing protectors, gloves, respirators, coveralls, aprons, and protective footwear.

Personal sampling
Measurement of personal exposure using sampling equipment worn by the individual worker.

Protective factor
Anything that reduces a person's chance of developing a disease.

Radiation therapy
The use of X-rays, gamma rays, and high-energy particles to damage cancer cells, stopping them from growing and dividing.

Risk factor
Anything that increases a person's chance of developing a disease.

Sarcoma
A malignant tumour arising in connective tissue, bone, cartilage, or striated muscle.

Stage
Determination of extent of cancer in the body.

Substitution
Replacing a toxic substance with a less hazardous substance at the workplace.

Tumour
An abnormal mass of tissue that is not inflammatory, arises without obvious cause from cells of preexistent tissue, and possesses no physiologic function.

WHMIS
A Canadian system that provides information on hazardous materials used in the workplace.

Workplace exposure assessment
The measurement of chemicals in the workplace environment by area sampling and personal sampling.

About the Alberta Cancer Board

The Alberta Cancer Board is a Provincial Health Authority operating cancer facilities and programs in Alberta. Services include cancer prevention, early detection, diagnosis, treatment, research and education. Also included in this role is coordinating, in cooperation with others, the planning, development and delivery of provincial cancer initiatives.

As part of this mandate, five divisions carry out the business of the Alberta Cancer Board:

Two are facility-based and deliver patient care – the Cross Cancer Institute in Edmonton, responsible for patients in northern Alberta, and the Tom Baker Cancer Centre in Calgary, responsible for patients in southern Alberta.

Medical Affairs and Community Oncology (MACO) was created to ensure that the same quality of cancer services is available to all Albertans regardless of where they live, and is particularly focused on the delivery of cancer care to rural centres.

The Division of Population Health and Information (PHI) is focused on the front-end of the cancer spectrum to determine and have an impact on the environmental, biological and behavioural factors that lead to the development of cancer. PHI encompasses the the Cancer Prevention Program, Population Health Research, the Alberta Cancer Registry, Screening Programs, the Integrated Cancer Care Network (ICCN), the Information Security and Privacy Office (ISPO), and Information Systems.

Finally, the Research Division coordinates the basic, applied, clinical and population-based research that is performed in the facilities and divisions of the Alberta Cancer Board.

About Work Safe Alberta

Work Safe Alberta is a unique partnership between industry, labour and government that has reduced Alberta's workplace injury rate by 24% in less than three years. This represents more than 10,000 fewer serious injuries to workers each year. Under the Work Safe Alberta initiative, industry, safety associations, labour and government work together to reduce workplace incidents through public awareness, health and safety education, legislative changes, and increased compliance efforts and prosecutions.

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- Kenneth Corbet MD FRCPC Clinical Associate Professor, Department of Community Health Sciences, The University of Calgary
- Staff at Workplace Health and Safety, Policy and Legislation, Alberta Human Resources and Employment

Edited by:

Claire Fayers, Health Resources Coordinator, Alberta Cancer Board

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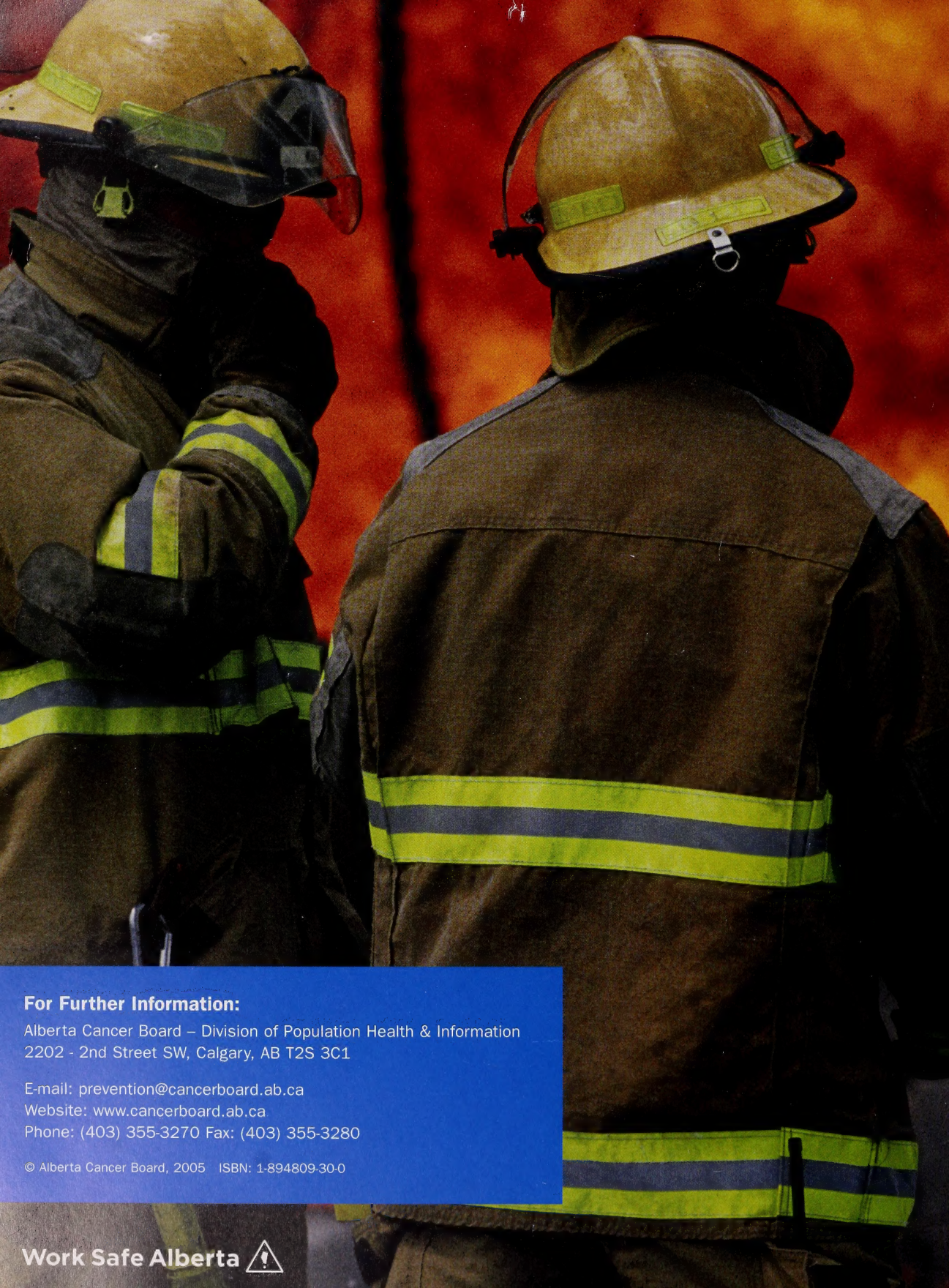

For Further Information:

Alberta Cancer Board – Division of Population Health & Information
2202 - 2nd Street SW, Calgary, AB T2S 3C1

E-mail: prevention@cancerboard.ab.ca
Website: www.cancerboard.ab.ca
Phone: (403) 355-3270 Fax: (403) 355-3280

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